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**THREE NEW GENERA AND ONE NEW SPECIES OF
THE FAMILY GONOSTOMATIDAE**

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No. 4 — *Three New Genera and One New Species of the
Family Gonostomatidae*

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In the course of revising the family Gonostomatidae for a forthcoming volume on the Fishes of the Western North Atlantic, it was found necessary to create several new genera. And since it has been decided that descriptions of new genera and species should not be included in that monograph, we hasten to give such original descriptions in short papers which will antedate the larger work.

Two of the genera described below are based on previously known species. The third genus, hitherto unknown, is described from specimens trawled in 1957 aboard the U.S. Fish and Wildlife Service research vessel *Oregon*.

Figure 1 has been prepared by Mr. John Piffner, Staff Artist, Chicago Natural History Museum, and Figures 2 and 3 by Mrs. Myvanwy M. Dick, Museum of Comparative Zoology.

Terminology. The following symbols are used to represent the photophores: ORB, those situated close to the eye; OP, opercular photophores; SO, a pair often found near the symphysis of the lower jaw; BR, organs on the branchiostegal membranes; IV, pre-ventral photophores of the ventral series; VA, those of the ventral series found between the ventral bases and the anal origin; AC, photophores of the ventral series posterior to the anal origin; IC, total number in the ventral series, from tip of isthmus to base of caudal; OA, photophores of the lateral series. Photophore counts in parentheses indicate that these organs are grouped in a common gland.

POLLICHTHYS, new genus

Yarrella Jespersen and Tåning, 1919, Vidensk. Medd. Dansk Naturh. Foren., 70:223; Norman, 1930, Discovery Rep., 2:288 (part); Fowler, 1936, Bull. Amer. Mus. Nat. Hist., 70:1202 (part); Lozano Rey, 1947, Mem. R. Acad. Cien. Madrid, Ser. Cien. Nat., 11:171.

Type species: *Yarrella mauli* Poll.

Generic characters. Eye normal, moderate. Snout slightly longer than orbit. Interorbital width at center of eye about

equal to or a little less than diameter of orbit. Mouth large, oblique; edge of premaxillary straight; toothed edge of maxillary curving downward from juncture with premaxillary, becoming almost straight posteriorly, nearly reaching preoperele. Premaxillary about half as long as toothed portion of maxillary. Angle of preoperele acute. Upper jaw with a single row of teeth, consisting of rather evenly spaced longer teeth and one or two smaller ones in each interspace, some of the interspace teeth curving inward. Teeth of lower jaw similar but smaller, and, anteriorly only, an outer row of very small teeth. Vomer toothless or with one or two small teeth on each side. Palatines each with a short row of small teeth. Pterygoids with or without a patch of very minute teeth on each side. Tongue usually with an irregular row of minute teeth centrally, not reaching tip. Gill rakers 11-12 + 4-5 on first arch. Spines on inner edge of first gill arch very short, a cluster of minute prickles below each one. No pseudobranchiae. Scales present but very deciduous. Anus closer to anal fin than to ventral bases, beneath fifth to seventh VA photophore. Head and trunk longer than tail. Dorsal origin about in middle of body length or slightly posterior to it. Anal origin beneath front or middle of dorsal fin. Ventral bases well ahead of dorsal origin. Adipose fin rather long-based, situated above a vertical from slightly behind middle of anal fin. ORB 2, one close to and below front margin of eye, the other beneath posterior margin of eye, the anterior one larger and apparently double, the posterior one similar in form to body photophores. OP 3, about equal in size, upper one level with upper edge of pupil, lower ones level with end of maxillary. SO present. BR 8. Body with two rows of photophores; photophores present on isthmus. IV 21-23, eighth and/or ninth slightly displaced. VA 7-9. AC 18-21, straight, four or five of them behind anal fin. IC 47-50. OA 19-21, reaching to a vertical from last one or two VA or first AC photophore. No other photophores, and no luminous tissue, on head or body as far as known. Fin rays: dorsal 10-12, anal 22-30, pectoral 8, ventral 6-7. Branchiostegal rays 11-12, no spines at bases. Vertebrae perhaps around 40 (count made on a faint X-ray photograph of one specimen).

Remarks. *Pollichthys* is probably most closely related to *Vinciguerria* Jordan and Evermann, from which it differs principally in having a longer and more forwardly placed anal fin. It is also similar to *Polymetme* McCulloch in some respects, and its dentition is rather like that of *Gonostoma* Rafinesque. It is not closely related to *Yarrella* Goode and Bean, with which it has been confused for many years. *Yarrella blackfordi* Goode and Bean has been found to possess serial photophores on the body above the IC and OA, arranged like those of *Lychnopoles argenteolus* Garman. And the genus *Yarrella*, of which *Lychnopoles* Garman is a synonym, contains only two species, *blackfordi* and *argenteola*.

The new genus has been named for Dr. Max Poll of the Musée Royale du Congo Belge, Tervuren, Belgium.

POLLICHTHYS MAULI (Poll)

Yarrella mauli Poll, 1953, Rés. Sci. Exp. Océanogr. Belge (1948-1949), vol. 4, fasc. 2, pt. III, p. 59, fig. 24, (5°15' S., 11°29' E., 225-240 meters).

Yarrella blackfordi Jespersen and Tåning, 1919, Vidensk. Medd. Dansk Naturh. Foren, 70:223, pl. 17, fig. 13; Breder, 1927, Bull. Bingham Oceanogr. Coll., 1, (1), p. 18 (re-identified as *P. mauli* by Morrow, 1958, *in litt.*); Norman, 1930, Discovery Rep., 2:288, fig. 7; Jespersen, 1933, Faune Ichth. Atl. Nord, 14, fig.; Parr, 1934, Bull. Bingham Oceanogr. Coll., 4 (6), p. 5 (re-identified as *P. mauli* by Morrow, 1958, *in litt.*); Fowler, 1936, Bull. Amer. Mus. Nat. Hist., 70:1203 (part), fig. 518; Beebe, 1937, Zoologica, 22:201; Parr, 1937, Bull. Bingham Oceanogr. Coll., 3 (7), p. 45 (re-identified as *P. mauli* by Morrow, 1958, *in litt.*); Lozano Rey, 1947, Mem. R. Acad. Cien. Madrid, Ser. Cien. Nat., 11:172, fig. 42; Grey, 1955, Fieldiana, Zool., 37:272.

Specimens reported as *Yarrella blackfordi* by Marshall (1951, p. 3, and 1954, p. 204, fig. VIII, 10) probably belong to this species also.

The generic diagnosis has been based both on published descriptions and the following specimens, some of them hitherto unrecorded.

Bermuda, *Caryn*: Thirteen specimens, all somewhat shrunken since earlier measurements were made (Grey, 1955, p. 272). Haul 20, 400-450 meters, one, standard length 32 mm. Haul 22, 730-820 meters, three, 45-48.5 mm. Haul 23, 400-450 meters, two, 29.5-ca. 31.5 mm. Haul 25, 400-450 meters, one, 39 mm. Haul

26, 590-660 meters, two, 38 and ca. 45 mm. Haul 27, 1280-1370 meters, one, 34.5 mm. Haul 44, 400-450 meters, one, 38 mm. Haul 56, 260-275 meters, one, ca. 38 mm. Haul 62, 1000-1100 meters, one, 39 mm.

Bermuda: Five specimens, Stanford University No. 46475, recorded as *Yarella blackfordi* by Beebe (1937, p. 201), Bermuda Oceanographic Expeditions, 1929-1930, of the New York Zoological Society. Net 861, 1280 meters, one, 16 mm. Net 867, 1463 meters, one, 20.5 mm. Net 888, 732 meters, one, 33.5 mm. Net 897, 1463 meters, one, ca. 12.5 mm. (but shrunken). Net 954, 1829 meters, one, ca. 13.5 mm. (but shrunken).

Bermuda: One specimen, U.S.N.M. No. 100537, 36 mm., *Grampus (Bache)* Station 10176, 32° 30' N., 65° 48' W., 5 February 1914, 750 meters.

Atlantic off Florida: One specimen, U.S.N.M. No. 100627, 39.5 mm., *Grampus (Bache)* Station 10202, 25° 34' N., 79° 24' W., 19 March 1914, 75 meters.

Atlantic off Florida: Fifteen specimens, ca. 16-37.5 mm., Miami University Marine Laboratory Collection, taken in plankton hauls made in ca. 25° N., 79° W., under the auspices of the National Geographic Society. Depth of capture 503 or 686 meters, one, front part of body only; 457 meters, one, standard length 25 or 26 mm.; 439-541 meters, one, 22 mm.; 212-366 meters, one, 24.5 mm.; 366 meters, one, metamorphosing, 17 mm.; 210 meters, one, 23.5 mm.; 155 meters, one, metamorphosing, 16-16.5 mm.; 137 meters, one, 26.5 mm.; 119 meters, one, 27.5 mm.; 110 meters, one, 17 mm.; 55 meters, one, 24 mm.; 29-66 meters, one, 22.5 mm.; 15 meters, one, 37.5 mm.; depth unknown, two, 17.5 and 36 mm.

Caribbean Sea: One specimen, U.S.N.M. No. 108281, ca. 37 mm., *Caroline*, off the Virgin Islands, 18° 35' 30" N., 65° 23' 54" W., 26 February 1933, 300 fathoms (549 meters).

Caribbean Sea off Nicaragua, *Oregon*: One specimen, ca. 44.5 mm., Station 1905, 12° 22' N., 82° 27' W., 11 September 1957, 275 fathoms (503 meters). One specimen, 45 mm., Station 1907, 12° 25' N., 82° 23' W., 11 September 1957, 400-425 fathoms (732-777 meters).

Western Pacific off eastern Negros, Philippines: Six specimens, 16.5-40 mm., *Albatross* Station 5190, 10° 8' 15" N., 123° 16' 45" E., 295 fathoms (540 meters).

P. mauli has not been found, so far, in the Gulf of Mexico, but is known from a large area in the North Atlantic west of 35° N. and south of 40° N., as well as off the African coast between 5° and 11° S. Although it has not previously been reported outside the Atlantic, the Chicago Natural History Museum collection contains six specimens from the Philippines, received in exchange from the United States National Museum.

The following counts have been made on Atlantic specimens: dorsal rays 10-12, anal rays 25-26, pectoral rays 8, ventral rays 6-7, branchiostegal rays 11-12, gill rakers on first arch 11-12 + 5. The photophores are small but conspicuous: BR 8; IV 22, eighth and/or ninth slightly elevated; VA 7-9, scarcely separable from AC: AC 18-20, four or five of them behind anal fin; IC 49-50; OA 19-21, reaching a vertical from the next-to-last VA, the last VA, or the first AC photophore.

Individual variation is rather slight and it is interesting that specimens from the Pacific differ very little from Atlantic specimens. The largest of these, 40 mm. in standard length, has a slightly greater depth and more posterior insertion of the dorsal fin, lacks the vomerine and pterygoid teeth, and has only 47 photophores in the ventral row (IC), but is otherwise indistinguishable from Atlantic specimens. Of the smaller examples, 16.5-26 mm. in standard length, four also have an IC count of 47, and in the fifth it is 48. Counts of the largest Philippine specimen are as follows: dorsal rays ca. 10, anal rays ca. 24, branchiostegal rays 11 or 12, gill rakers on first arch 11 + 4. Photophores: BR 8; IV 21, the eighth and tenth slightly below, and the ninth slightly above, the level of the first seven; VA 7; AC 19, five of them behind the anal fin; IC 47; OA 21, reaching a vertical from the first AC photophore.

The following measurements are expressed in per cent of the standard length, 40 mm., and are followed in parentheses by similar measurements of nine western Atlantic specimens, whose standard lengths are 37.5-48.5 mm. Depth 15.0 (11.9-14.5); head 23.8 (20.6-ca. 24.4); snout ca. 5.0 (5.1-5.55); orbit ca. 3.75 (2.56-4.45); interorbital width at center of eye ca. 2.5 (2.22-3.33); upper jaw 16.2 (15.4-17.9); premaxillary 5.0 (5.12-6.4); toothed edge of maxillary 11.2 (10.0-11.5); tip of snout to dorsal origin 52.5 (49.3-51.5), to anal origin 55.0 (53.3-56.6), to ventral bases

41.5 (ca. 39.0-43.3); distance between anal origin and base of middle caudal rays 42.5 (41.0-44.7), last anal ray and base of middle caudal rays 11.2 (10.2-13.1), last dorsal ray and base of middle caudal rays 33.8 (ca. 33.3-37.1), last dorsal ray and adipose fin 13.7 (12.8-15.8), ventral bases and anal origin ca. 12.5 (13.3-15.4); least depth of caudal peduncle 3.75 (3.1-4.45); dorsal base ca. 8.75-10.0 (10.2-12.4); anal base ca. 31.2 (ca. 28.9-ca. 31.6).

Metamorphosing specimens. Postlarval stages of *P. mauli* have not yet been described, but among the young fishes in the collection of the Miami University Marine Laboratory are two metamorphosing specimens. The younger of these is about 17 mm. in standard length. It is somewhat more slender than the older fish, which is 16-16.5 mm. in standard length; and it has the anal insertion farther back on the body, beneath the end of the dorsal fin. The posterior position of the anal fin might have prevented positive identification if the older specimen had not been at hand for comparison. The two little fishes obviously belong to the same species and it can only be assumed that during metamorphosis the body shrinks in length between the ventral bases and the anal origin, resulting in a more anterior insertion of the anal fin. This shrinkage undoubtedly occurs just in front of the anal fin, which, in the younger postlarva, is separated by a short gap from the last VA photophore.

In appearance, the two postlarvae from Florida are similar to metamorphosis stages of *Vinciguerria*. They differ most noticeably in the complete absence of pigment at the end of the caudal peduncle, and in having a longer tail and longer anal fin. The development of *Pollichthys* probably more or less parallels that of *Vinciguerria* in 1) having the photophores mostly formed, but unpigmented, prior to metamorphosis; 2) having most of the photophores pigmented simultaneously; 3) a rather sudden transition from the postlarval stage to the metamorphosis stage; and 4) the changes in body proportions proceeding rapidly toward the adult form. The smallest metamorphosed specimen known was 16 mm. in standard length (Jespersen and Taning, 1919, p. 223). It was not described. The smallest adolescents seen from the western Atlantic (off Florida) are 17 and 17.5 mm. in standard length and differ from adults only in having a

more slender body, less dorsal pigment, and only 14-15 OA photophores. Some of the more posterior OA and middle AC photophores are not fully developed on these little fishes, and even in specimens as large as 26-27 mm. the most posterior OA organs are still not fully developed.

The SO must appear quite early in this species as it is present in all adolescent specimens seen, including four from the Philippines. As in *Vinciguerria* it is the OA photophores that are last to develop, the full complement not being acquired until a standard length of 23-24 mm. has been reached. The number of OA on small Atlantic specimens is 14-15 at a length of 17 and 17.5 mm., 17-18 at a length of 22-23.5 mm. In the small Philippine specimens counts are 12 at 16.5 mm., 14 at 18 mm., 13 and 16 at 20 mm.

Description of younger metamorphosing specimen, standard length ca. 17 mm.: Eye oval shaped. Dorsal rays 10 or 11. Anal rays uncertain, at least 22 or 23, origin of anal beneath last dorsal rays. Pectorals small, pedunculate. Ventrals very small, membranous. Adipose fin long-based, well developed. Ventral finfold present on posterior half of distance between ventrals and anal. End of gut slightly protruding just in front of anal fin. Photophores on head: ORB 2, situated as in adult; lower posterior OP; BR 8; IV, 6 on isthmus, 13 from just in front of pectoral base to ventral base, the two groups separated by a short space in which one unpigmented organ is barely discernible. VA 9, the last two small, ending a short distance in front of anal origin. AC small and faintly pigmented above anal fin, 9 on left side, 11 on right side, the last two scarcely pigmented; and 2 larger ones on caudal peduncle. OA, 3 on left side, 1 on right side, faintly pigmented. Head and body entirely without pigment excepting the brown photophores; end of caudal peduncle transparent.

Description of older metamorphosing specimen, standard length ca. 16-16.5 mm.: Eye round. Dorsal rays 10. Anal rays uncertain, more than 20, origin of anal fin beneath fifth dorsal ray. Pectorals short, not pedunculate. Ventrals short, with rays developed. Adipose fin long-based, well developed. End of gut slightly protruding, anus below space between seventh and eighth VA photophore. Photophores on head: ORB 2; OP 3, the lower posterior the largest, the lower anterior and upper

ones small and lighter in color; BR 8, IV 22, the ninth slightly elevated. VA 8, not separated from anal origin or from AC. AC 18, the fifteenth poorly developed, the two or three preceding it very small, and the last three well developed. OA 5. Head without pigment except on photophores (brown). Body mostly colorless but with a streak of black internal abdominal pigment and very faint indications of the internal spots along base of anal fin.

WOODSIA, new genus

Type species. *Photichthys nonsuchae* Beebe, 1932.

Generic characters. Eye normal, large. Snout shorter than orbit. Interorbital width at center of eye less than diameter of orbit. Mouth large, oblique; edges of premaxillary and maxillary straight; maxillary reaching well past eye but not quite to edge of preopercle. Premaxillary more than half as long as toothed portion of maxillary. Angle of preopercle slightly acute. Teeth of upper jaw uniserial, larger on premaxillary than on maxillary, a few minute teeth between larger ones. Lower jaw with a series of widely spaced teeth, a few small interspace teeth and, anteriorly only, an outer row of a few widely spaced smaller teeth. Vomer toothless or with two rudimentary teeth. Palatines each with a long row of eurved teeth decreasing in size posteriorly. No teeth on pterygoids or tongue. Gill rakers 2-4 at angle, minutely denticulate, otherwise represented only by short, smooth spines. Spines on inner edge of first gill arch short. No pseudobranchiae. Anus close to anal fin. Head and trunk more than twice as long as tail. Origin of dorsal fin behind middle of body length. Origin of anal fin well behind end of dorsal fin. Ventral bases slightly in front of dorsal origin. Adipose fin well developed, above middle of anal fin. ORB 2, one close to front margin of eye, the other close to its posterior margin, the anterior one a little larger. OP 3, upper one slightly below a level from top of eye; lower anterior one about level with end of maxillary and smaller than either the upper one or the lower posterior one; the latter placed a little higher than the anterior lower organ. SO present, large. BR 14. No additional photophores on head. Body with two rows of photophores; photophores present on isthmus. IV $8 + 3 + 14 = 25$, the first eight

straight, the next three smaller and in an ascending cross line, the ninth being slightly below the eighth; and the last fourteen straight and on a level with the ninth (thus slightly lower than the first eight). VA 11-12. AC 12, straight, five or six of them behind anal fin. IC 48-49. OA 29-31, extending to, or nearly to end of anal fin. No additional photophores and no luminous tissue on body as far as known. Fin rays: dorsal 12, anal 14, pectoral 9-10, ventral 7-8. Branchiostegal rays 17, no spines at bases.

Remarks. *Woodsia* is closely related to *Photichthys* Hutton and, more remotely, to *Vinciguerria* Jordan and Evermann and *Ichthyococcus* Bonaparte. The structure of the photophores is similar in all of these genera and they also share such characters as two suborbital photophores, similar positions of the dorsal and anal fins, and a short tail. *Photichthys* and *Woodsia* are alike in their dentition, in having a longer premaxillary than other related genera, and a larger number of branchiostegal rays and BR photophores. The new genus differs from all gonostomatids in having the gill rakers reduced in number, and from *Photichthys* it differs further in the shorter anal fin, the deeper body form, and lower photophore counts.

The new genus has been named for Mr. Loren P. Woods, Curator of Fishes, Chicago Natural History Museum.

WOODSIA NONSUCHAE (Beebe)

Figure 1.

Photichthys nonsuchae Beebe, 1932, *Zoologica*, 13:61, fig. 11; 1937, *op. cit.*, 22:201.

Measurements and other information about the holotype of this species, U.S.N.M. No. 170938, have been obtained through the kindness of Dr. Giles W. Mead; and to Dr. Alfred W. Ebeling and Dr. Carl L. Hubbs I owe the opportunity of studying a specimen from the Gulf of Panama, Scripps Institution of Oceanography No. SIO-55-244, standard length 76.5 mm. It was taken in 730-0 fathoms (1335-0 meters), 14 November 1955, 4° 04' N., 78° 43' W. The following description is based on the Pacific specimen.

Dorsal rays 12, anal rays 14, pectoral rays 10, ventral rays 8, branchiostegal rays 17.

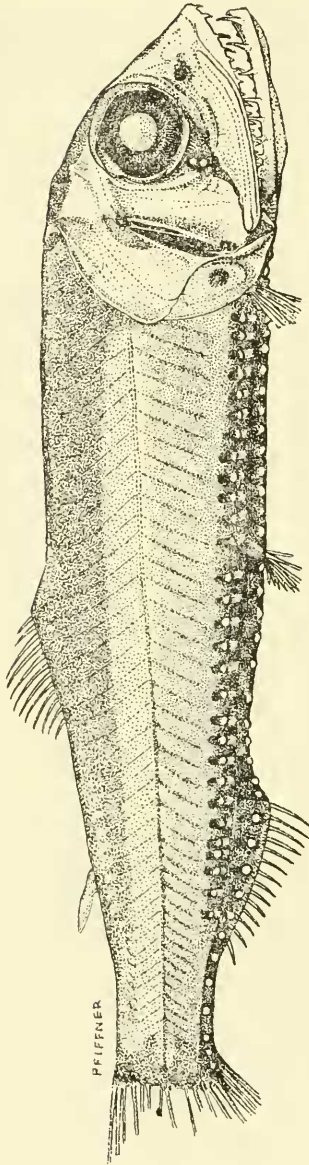


Fig. 1. *Woodsia nonsuchae* (Beebe). Scripps Institution of Oceanography
No. S10-55-244, standard length 76.5 mm., Gulf of Panama.

Measurements in millimeters: depth 15.5; head ca. 23; snout ca. 5.5; orbit ca. 7.5; interorbital width at center of eye ca. 5; upper jaw 16; premaxillary 7.5; toothed portion of maxillary 8.5; lower jaw 17; tip of snout to dorsal origin 43.5, to anal origin ca. 56, to ventral base 39.5; distance between anal origin and base of middle caudal rays 20.5, last anal ray and base of middle caudal rays 11, last dorsal ray and base of middle caudal rays 26.5, last dorsal ray and adipose fin 11, ventral base and anal origin 17; least depth of caudal peduncle 7; dorsal base 8; anal base 10.5; pectorals and ventrals broken.

Scales and most of skin lost. Bones of head fragile, jaws and snout somewhat damaged. Gill rakers on first arch developed only at angle, two on left side, three on right side; otherwise represented by 3-4 very short, smooth spines on upper limb and 11 clusters of two or three little spines on lower limb; total count of gill rakers and rudiments $13 + 4$ on left side, $13 + 3$ on right side.

Premaxillary with a single row of six slender, widely spaced teeth, curving slightly inward, the first and last of these smaller; sometimes a few minute teeth in interspaces. Maxillary with a single row of about ten smaller teeth, and a few minute teeth in each interspace. Lower jaw with a series of seven to nine widely spaced slender teeth, most of them as long as the longest premaxillary teeth; a few sparse, smaller interspace teeth; and anteriorly only, an outer row of four widely spaced teeth, smaller than those of inner row. Vomer toothless. Each palatine with a row of about eleven widely spaced, curved teeth, the posterior ones minute. Pterygoids and tongue without teeth.

Photophores conspicuous, many of them "double," the upper black-sheathed portion enlarged and, in some cases (especially on the head) apparently with an exposed luminous area; this double aspect particularly noticeable in the ORB, SO, BR, OP, AC, OA and the pre-pectoral IV. BR 14. IV $8 + 3 + 14 = 25$. VA 11. AC 12, five of them behind anal fin, the last three smaller and slightly separated from the rest. OA 29, the last four quite small, ending above the twelfth anal ray.

Myomere count probably about 45.

A series of pores along lateral line area anteriorly; and on sides from behind head to anal origin smaller pores, which follow

the lines of the septa between the muscle bands, both above and below the lateral line.

Other characters as in generic diagnosis.

Color probably brown or black, judging from remains of skin. Linings of mouth and gill covers dusky. Adipose fin blackish.

Remarks. The newly discovered Pacific specimen differs remarkably little from the holotype, which was caught off Bermuda at a depth of 1097 meters. Dr. Giles W. Mead has examined the latter, and percentages based on his measurements are shown in the table. The most important correction of the original description is the length of the premaxillary, which, in the figure of the type, was shown to be less than half as long as the toothed portion of the maxillary. Actually it extends to a vertical from the anterior edge of the pupil and bears eight longer teeth (on each side). Dr. Mead has also confirmed the presence of the SO and upper OP photophores. As shown in the table, the Pacific specimen differs in counts from the holotype only in having one more ventral ray, one more pectoral ray, one less VA and two less OA photophores. The two specimens are almost identical proportionately with one notable exception, i.e., the lengths of trunk and tail. The Atlantic fish has a longer trunk and shorter tail, the insertion of the anal fin being farther behind the end of the dorsal fin than in the Pacific specimen, and the distance between the ventral bases and the anal origin is also a little longer. If future material should prove this difference to be invariable, the Pacific form would probably require a new specific name, but in view of the fact that the two specimens are otherwise so similar, they are for the present considered to belong to a single species, *nonsuchae*.

Table. Counts and measurements of *Woodsia nonsuchae* taken from the literature where indicated.

	Beebe, 1932, p. 61	U.S.N.M. 170938 (Mead, 1958, <i>in litt.</i>)	S10-55-244
Standard length	89	ca. 85.4	76.5
Dorsal rays	12	12	12
Anal rays	14	14	14
Pectoral rays	9	9	10
Ventral rays	7	7	8

	Beebe, 1932, p. 61	U.S.N.M. 170938 (Mead, 1958, <i>in litt.</i>)	SIO-55-244
Branchiostegal rays	—	16?	17
Gill rakers on first arch	4	—	2-3
Total number of gill rakers and rudiments	13+5	—	13+3-4
ORB	2	2	2
OP	—	3	3
SO	—	+	+
BR	14	—	14
IV	11+14=25	—	8+3+14=25
VA	12	—	11
AC	12	—	12
IC	49	—	48
OA	31	—	29
Long teeth in upper jaw	19	—	16
Long teeth in lower jaw	10	—	7-9
Vomerine teeth	2 rudiments	—	0
Palatine teeth	11	—	11

per cent of standard length

Depth	20.2	20.5	20.2
Head	29.8	30.4	ca. 30.0
Snout	7.3	6.4 ¹	ca. 7.2
Orbit	9.0	10.5	ca. 9.8
Interorbital width at cen- ter of eye	5.05	7.6	ca. 6.54
Upper jaw	—	21.0	21.0
Premaxillary	—	ca. 9.36	9.8
Toothed portion of max- illary	—	12.3	11.1
Lower jaw	20.8	ca. 21.6	22.2
Tip of snout to:			
dorsal origin	—	ca. 57.4	57.0
anal origin	—	76.7	ca. 73.4
ventral base	—	51.5	51.6
Distance between:			
anal origin and caudal base	—	25.5	26.8
end of anal and caudal base	—	13.45	14.4

¹ Snout now in poor condition.

	Beebe, 1932, p. 61	U.S.N.M. 170938 (Mead, 1958, <i>in litt</i>)	SIO-55-244
	per cent of standard length		
end of dorsal and caudal base	—	33.4	34.6
end of dorsal and adipose	—	13.45	14.4
ventral base and anal origin	—	25.8	22.2
Least depth of caudal peduncle	8.43	8.9	9.15
Dorsal base	—	9.37	10.45
Anal base	—	14.0	13.7

SONODA, new genus

Type species. Sonoda megalophthalma, new species.

Generic characters. Eye normal, very large. Snout shorter than orbit. Interorbital width at center of eye much less than diameter of orbit. Mouth moderate, almost vertical; edge of premaxillary slightly concave or nearly straight; toothed edge of maxillary convex, not quite reaching a vertical from posterior margin of pupil. Premaxillary shorter than toothed portion of maxillary but more than half its length. Angle of preopercle vertical. Teeth minute, uniserial in upper jaw, in two or more rows anteriorly in lower jaw. Vomer with three or four small teeth on each side. Palatines with a single row of minute teeth. Pterygoids and tongue probably toothless. Gill rakers 15-18 + 3 on first arch. No spines on inner edge of first gill arch except sometimes a single minute one on upper limb; second arch with one or two clusters of minute spines. Pseudobranchiae sometimes present, small. Scales present, deciduous. Head and trunk slightly shorter than tail. Anus close to ventral bases. Dorsal origin slightly nearer snout than base of caudal. Anal in two sections, connected by membrane, its origin beneath or slightly in advance of first dorsal ray. Ventral bases well ahead of dorsal origin. No adipose fin. ORB 1, in front of lower portion of eye. OP 3, upper one close to eye and level with middle of eye; lower anterior one at end of maxillary; lower posterior one vertically

elongate, in a black sheath with luminous areas showing above and below (probably double). SO absent. BR usually (6), (7) on one side of one specimen. Body with two rows of serial photophores: photophores present on isthmus. IV (6) + (10); the first six larger; the fourth, fifth and sixth curving upward toward pectoral base; the last ten close together and separated from those on the other side only by two black bands on belly. VA (7) or (8), joined above to a common gland. AC in two long groups, (16-21) + (19-24) = 36-43, the organs small, separated below but joined above to narrow glands; the first group commencing over seventh or eighth anal ray, second group commencing above last anal ray. IC 59-67. OA (2) + 4-5 = 6-7, the first two joined above to a gland, others separate. No additional photophores or patches of luminous tissue on head or body as far as known. Fin rays: dorsal 8-9; anal 8-9 + 14-16 = 22-25, the first eight or nine rays thicker than the rest and separated from them by a short but definite space, although connected by a relatively thick membrane; pectoral 13-15; ventral 6. Branchiostegal rays 8, no spines at bases. Vertebrae 40 including hypural, counted on an X-ray photograph of one specimen.

Remarks. *Sonoda* is in some respects intermediate between *Maurolicus* Cocco and *Valenciennellus* Jordan and Evermann. It is similar to the latter in the relative positions of the dorsal, anal and ventral fins, in having the trunk shorter than the tail, and in lacking the SO. In the arrangement of the AC photophores the new genus is closer to *Maurolicus* and there is at least a superficial similarity in the shape of the anal fin in these two genera also. However, in *Maurolicus* the anal fin does not seem to be actually in two separated sections as it is in *Sonoda*. The lower posterior OP, and some of the IC photophores, are similar in structure to those of *Argyripnus* Gilbert and Cramer. In having 7-8 VA photophores *Sonoda* differs from all other known maurolicid genera, in which these number only 4-6.

The new genus is named for Miss Pearl Sonoda, Assistant in the Division of Fishes, Chicago Natural History Museum.

SONODA MEGALOPHTHALMA, new species

Figures 2, 3

Holotype. Standard length 58 mm., Oregon Station 1918, 13° 25' N., 82° 01' W., 12 September 1957, 300 fathoms (548 meters).

Paratypes.

Two specimens, standard lengths 54-55 mm., taken with the holotype.

One specimen, 43.5 mm., *Oregon Station* 1924, 12° 50' N., 82° 12' W., 13 September 1957, 275 fathoms (503 meters).

Four specimens, ca. 50-60 mm., *Oregon Station* 1928, 13° 14' N., 82° 06' W., 12 September 1957, 300 fathoms (548 meters).

Five specimens, 44.5-52.5 mm., *Oregon Station* 1931, 13° 56' N., 81° 50' W., 14 September 1957, 275 fathoms (503 meters).

Eleven specimens, 48.5-58 mm., *Oregon Station* 1933, 14° 08' N., 81° 49' W., 14 September 1957, 300 fathoms (548 meters).

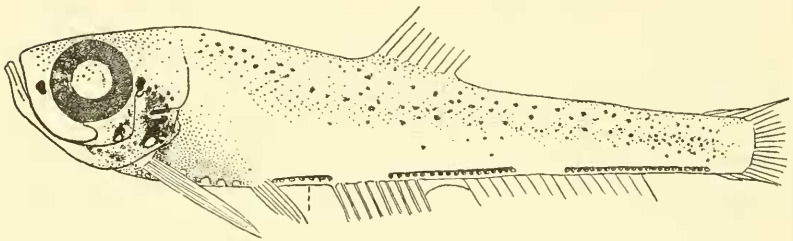


Fig. 2. *Sonoda megalophthalma* n.sp. Holotype, standard length 58 mm., *Oregon Station* 1918, Caribbean Sea.

Description. Dorsal rays 8-9 (holotype, 9); anal rays 8-9 + 14-16 = 22-25 (holotype 9 + 15 = 24); pectoral rays 13-15 (holotype 14); ventral rays 6; branchiostegal rays 8; gill rakers on first arch 15-18 + 3, counted on four specimens (holotype 16 + 3); pyloric caecae 6; vertebrae 40, including hypural, counted on holotype only.

Measurements of the holotype in millimeters: standard length 58, greatest depth 12, length of head 14.5, snout 3, diameter of orbit 6.5, interorbital width at center of eye ca. 2, upper jaw ca. 9. Tip of snout to dorsal origin 26, to anal origin 25.5, to ventral bases ca. 20. Distance between anal origin and base of middle caudal rays 32.5, last anal ray and base of middle caudal rays 10, last dorsal ray and base of middle caudal rays 24. Least depth of caudal peduncle 5. Dorsal base 6. Anal base 23. Length of pectoral fin 11, of ventral fin ca. 5.

Measurements expressed in per cent of standard length, of nineteen specimens, standard length 43.5-60 mm.: depth 19.0-21.8; head ca. 23.4-25.7 (and one, 27.3); snout 4.5-6.36; orbit 10.3-12.1; interorbital width at center of eye 2.19-3.54; upper jaw 15.0-16.4; tip of snout to dorsal origin 43.0-47.7, to anal origin 41.0-46.6, to ventral bases ca. 32.4-38.2; distance between first anal ray and base of middle caudal rays 54.0-57.6, last anal ray and base of middle caudal rays 15.2-19.1, last dorsal ray and base of middle caudal rays 37.1-45.4; least depth of caudal peduncle ca. 7.0-9.25; dorsal base 8.6-11.0; anal base ca. 36.4-41.4; pectoral length 17.0-24.1; ventral length ca. 6.9-11.3.

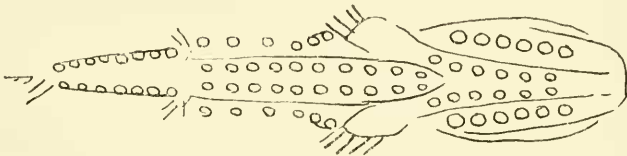


Fig. 3. *Sonoda megalophthalma* n.sp. Diagrammatic ventral view of anterior portion of body, showing position of light organs.

Bones and skin of head very fragile, nostrils not apparent except on one specimen, in which they appear to be placed high on snout as in other gonostomatid fishes. Pseudobranchiae small, found on only a few specimens, perhaps lost in others because of their fragility. Skin of abdomen thin, often damaged. A large, thin, cycloid scale present beneath pectoral of one specimen from St. 1933, no scale pockets visible, extent of scalation unknown. Fin rays fragile, mostly broken, probably normally all rather long, judging from remnants. Pectoral in some specimens reaching first or second anal ray. Ventrals, when complete, reaching anal origin.

Photophores of BR, IV and OA series relatively large, the VA, and especially the AC, smaller. Total number of IV organs always 16, those of BR 6 except in one specimen, which has 6 on one side, 7 on the other. Number of VA and AC organs variable, the former 7 in twelve specimens, 8 in eight specimens and 7/8 in two specimens; those of AC often differing on the two sides of a single specimen. OA variable but usually 6. Fin rays also

varying in number: dorsal 9 in nineteen specimens, 8 in four specimens; first group of anal rays 9 in twenty specimens, 8 in two specimens; second group of anal rays 15 in ten specimens, 16 in seven specimens, 14 in one specimen; total number of anal rays 24 in ten specimens, 25 in six specimens, 22 in one specimen; pectoral rays 14 in twelve specimens, 15 in three specimens, and 13 in two specimens; ventral rays always 6.

Color in alcohol: body largely pale yellowish or whitish, sprinkled with black chromatophores; abdomen black, sometimes with bluish or greenish iridescence anteriorly. Opercles and lower part of head black. Snout, lower jaw and top of head colorless and transparent. A yellowish body visible beneath top of head between and behind eyes. Fins colorless. Inside of mouth colorless. Linings of gill chamber and peritoneum black.

At least five specimens are mature females.

Characters otherwise as in generic diagnosis.

LITERATURE CITED

BEEBE, W.

1932. Nineteen new species and four post-larval deep-sea fish. *Zoologica*, **13**:47-107, figs. 8-31.
1937. Preliminary list of Bermuda deep-sea fish. *Zoologica*, **22**:197-208.

GREY, M.

1955. Notes on a collection of Bermuda deep sea fishes. *Fieldiana, Zool.*, **37**:265-302, figs. 45-56.

MARSHALL, N. B.

1951. Bathypelagic fishes as sound scatterers in the ocean. *Jour. Mar. Res.*, **10**:1-17.
1954. *Aspects of deep sea biology*. London. 380 pp., 4pls., text figs.